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Research on Improving Innovative Ability of College Students in Electronic Information Major

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Abstract

In order to settle the lack of innovative ability of the present college students in electronic information major, some urgent problems existing in current high education have been analyzed. Our school useful experiences in electronic information training are discussed. The methods include teaching ideas update, training program development, reform of classroom teaching methods, experiment, and practice, guiding students in scientific research and innovation practice. The experimental results indicate that the innovative ability of college students in electronic information major can be improved by our methods, and these researches have some value for reference and promotion.

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1. Introduction

In the 21st century, information science plays an important role in this the era of the knowledge economy. It has penetrated into all fields, like computer, communications, transportation, medicine, Physics, chemistry, biology, military and economic and so on. Our country focuses on the development of Information industry. The major of Electronic and Information Engineering is one of the main professional training talents of electronics and information technology. With the deepening of the social information, every realm of society and the people's daily lives have close links with electronics and information technology and the demand for electronic information technology talents has increased. In order to meet the needs of social development, all kinds of universities are making an active effort to construct Electronic information specialty. Until 2009, 602 universities opened Electronics Information Engineering; on the talent training system is different. Our University also has offered successively Electronics Information Engineering, Communication Engineering, Electronic Science and technology, Network engineering and other new disciplines since 2001 and the great progress has been made through the several years' development.

2. The Actuality of Talent Training

With the rapid development of information industry in our county, Information technology manpower shortage is becoming a growing social problem. On the one hand, IT Technical Talents are short, On the other hand, our graduates of Electronic Information Specialty are confronted with an awkward situation of the difficult in employment due to lack of practical skills and creative abilities. Although the reasons for this situation are various, but the most important reason is the lack of creative and practical ability of college students, who are unable to meet the business need to have a pioneering spirit and innovative talents. An urgent problem before us is how to improve innovative ability of college students in electronic information major. The reasons for this are as follows:

(1) From College view, implementing concept of scientific development is to always uphold student-oriented. From the perspective of humanistic care, the college should do their best to improve the comprehensive quality and innovation ability of college students according to current college students facing urgent issues such as employment, advanced studies, helping them to better live up to the needs of society's high standards of qualified personnel.

(2) Cultivating innovation ability of college students is the innovational step of promoting the innovation of higher education. With the rapid development of economy, colleges and universities are required to cultivate a large number of students who have strong sense of innovation and practice ability in order to meet the urgent demands of the community for high-quality talents. Long-standing educational concepts can't keep pace with social progress, so colleges and universities should work out a plan of talents training to improve the students' professional skills and career accomplishments.

(3) Cultivate University student's innovation ability is an important way to enhance the employment ability of college students. College students' employment problem has become a social problem which is highly paid attention to by the whole society. The problem is not only related to the rational allocation of human resources of the State, but also more related to the construction of social harmony. Now the employment situation of the graduates is extremely grim. The employer pays more attention to the experience and ability of graduates, so improving the creative and practical ability of college students becomes more urgent.

(4) Electronic information is an emerging subject. It is still in the early stage of development in most provinces in our country, so there are many problems in talent cultivation and management needed to improve. On the other hand, the information industry of many provinces is behind the caste and developed areas due to regional difference. So to establish a perfect practice base or to connect with enterprises and research institutes have many difficulties, which affected the expanding of students horizons and grasping the recent developments in the electronics and information technology.

3. Measures of Improving Innovation Ability

Improvement of students' creative and practical ability is a complex system engineering which needs series of effective measures. Our school has always attached importance to the training of student's innovative ability and enacted some points of view on how to strengthen and improve practice teaching work of the Henan Polytechnic University, and opinions on constructing the experimental resource sharing service system of Henan Polytechnic University. The school sets up professional characteristics and special funds items and offers double matching funding of the characteristic specialty construction in colleges and universities. The funding is mainly used to help teachers to promote educational reform and scientific research and students to advocate innovation practice activities and competitions. Our school has accumulated much successful experience in the following aspects:

3.1 Renew teaching concept and value the classroom teaching

Teaching ideas is the guideline and guide of action for teachers in the teaching activities, which dominates the teaching behavior. To improve the creative and practical ability of students, renew teaching concept is the key problem. Our teachers regard the capacity development as the core, establish the triune talents training model of "teaching theory + practice + quality development" and formulate a comprehensive cultivation program of innovative ability according to the characteristics of electronic information specialty. During this process, the out-of-date courses are deleted and courses which reflect new results and new knowledge in electronic information engineering are increased according to the social development demands. Stress the cultivation of the students' ability and professional quality in practical teaching and strengthen Practice training reform in curriculum experiment, curriculum design, cognition practice, produce practice, graduation practice, and graduation project and so on. Combining the training objectives of electronic information specialty undergraduates, the graduation project time should be appropriately extended. At the beginning of the seventh semester, students are required to start to choose the graduation project topic and to know the assignment demands and encourages students to practice in enterprises out of school. The correlative practice bases are equipped with the appropriate teacher to help and manage students to make sure the students' professional knowledge match the social needs.

Most of the students learning life are spent in the classroom. Teaching is the key link to cultivate innovation ability of students. In the respect of theoretical teaching, we focus on ability training in knowledge impartment process, pay attention to basic and specialized services for the industry. Improving autonomous learning ability is the goal of teaching and learning organization way to effectively improve comprehensive capacity and quality of students including logical reasoning abilities, organizational and coordination skills, team spirit, excellent writing express and so on. Considering the objective, we integrate the relevant knowledge of previous courses, follow-up courses and parallel courses with the course content in every course. Meanwhile, combine with literature, history, traditional culture, technical invention, and daily life examples to show the interestedness and practicality of the courses and improve the students' humanity quality. We also combine the traditional which focus on knowledge content order with the modularized teaching methods of stressing the knowledge relationship in the aspect of teaching methods. It is a transition from the traditional method of teaching knowledge in classroom to a student-centered teaching method of elicitation, interactive, project case. We take a lot of effective measures to mobilize students' enthusiasm and positivity such as introducing scientific research project and electronic products in the classroom, outstanding student as "teacher".

On the other hand, the teachers' engineering quality and scientific research is also an important factor which influences students' cultivation of engineering quality. Currently part of young teacher is lack of engineering experiences. It is difficult for them to infiltrate the idea on project in the classroom, which is not conducive to developing the students who possess engineering awareness and the spirit of innovation. With this in mind, our school regards the engineering quality and scientific research ability of teachers as a key step of the teaching reform. In order to improve the teachers' comprehensive quality, we guide teachers to join teaching training and contest, organize teachers' participation in research projects of enterprises, enrich teachers' practical experience and send excellent young teachers every year to go abroad for a visit and as a degree candidate for domestic and international academic exchanges to enhance continuously the innovation and development ability of teachers.

3.2 Enhance the teaching of experiment, practice and practical and cultivate students' innovation ability

To improve students' innovation ability in the practical teaching environment, our school strengthens the experiment, practice and practical teaching reform to create a good training atmosphere. At the time of improving the training of students' innovative and practical ability of comprehensive and designing experiments, we continue to expand the opening up the laboratory. We bring the scientific research in

undergraduate courses, and let the students directly get in touch with forefront research of the corresponding disciplines. Previously the major's related lab of Electronic and Information Engineering teaching facilities are little and those experiments, course designs and other related subjects just stay on the software simulation which the students take not strong interests in and show a not positive attitude to. As a result, the experimental effect is poor. In recent years, Henan Polytechnic University (HPU) has established the National Electrical and Electronic Basic Teaching Demonstration Center and National Engineering Training Center. In the past 5 years, HPU invested more than 20 million RMB to purchase 2329 sets of experiment equipments with a complete range, sufficient quantity, advanced technology and good performance. What's more, the annual updated rate is 25%. Electrical and electronic experimental center has 16 labs, facing the 21 majors, and setting up 23 experimental courses. The experiment center, with the advantages of advanced equipments, perfect functions and outstanding feature, has become a practical teaching platform which can meet the basic skills training and the needs of cultivating innovative talents. At the same time, our school establish the network administrate platform about undergraduate course teaching, networked experiment teaching management platform, and internship bases in and out school, all of which provide sufficient material guarantees for researching and practicing the innovation & carve out personnel training pattern.

Our school strengthens the practice teaching, expands the practice capital input, knows the work range, technical terms and work process, makes students really enter into the enterprises through various ways and improves teachers' practical teaching ability. In the side of construction of professional practice base, our school has taken some steps in order to strengthen the contact with the enterprises and know the information of companies' demand of qualified personnel. We not only invite professional staffs of ZTE, HUAWEI, CTC, CMCC, and other enterprises to do reports for our students, which aroused students' interests in the major of electronic information engineering, but also strengthen the communication and cooperation with enterprises, which can create employment and practice platform for the students. Attending practice in the enterprises can arouse their professional interests and apply the knowledge they learned into practice. At the same time, they can timely discover the deficiency in the gap between the theory and practice abilities and the professional qualities, which not only continuously improves students' professional skills, but also lays a solid foundation for universities providing qualified talents for enterprises. Hence we set up a new training mode of learning-research, ensuring the basic eligibility of talent training, and also reflecting the personalized, diversity, multiplex talents training's needs. By cultivating practice base and the product teaching and research base, let the students' ability adapt to the requirements of the development of enterprises and society better.

3.3 Guide student to participate in scientific research and innovation practice activities

We establish a long-term mechanism to promote the electronic information majors to participate in research and innovation practice activities and arouse the students' bidirectional enthusiasm for independent participation in scientific research and instructors' instruction. Teachers and students are also encouraged to participate in the "undergraduate electronic design contest", "college students technology training plan", "climbing program in science and technology of University students", to improve practical engineering development ability. students are especially encourage to participate in research projects, open the second class, breed innovation spirit of students from the students' professional interest and improve the ability of practice. Here is the main work of the author, which has been proved by practice that can effectively improve the student's innovation capability.

(1) Guide the undergraduate s' scientific research training programs. Henan Polytechnic University implemented the first student research training program(SRTP) in 2003, and since then we have successfully carried out it for eight times. The SRTP project comes from the basic, applied and developmental research subject which is from different areas of teacher's teaching, scientific research, production and management. Each project allows 3 to 6 students to participate in. Many teachers have guided SRTP project many times. The program strengthens the communication between teachers and students and presents a number of innovative projects and they are resolved successfully.

(2) Guide laboratory to open Foundation project. This project is our teachers ' and students ' self-made and have integrated and innovative experimental project according to the existing laboratory conditions. It will be open to whole school students following the success of the experimental project. This practical form enhances greatly the creative enthusiasm of teachers and students, and research results can be shared by other students, who participate in the experiment later.

(3) Guide the research project of experimental technique in Electrical and Electronic Experiment Center. The Electrical and Electronic Experiment Center in our school is National Electronic Experimental Education Demonstration Center. The research project of experimental technique unites over more than the central 20 laboratories mainly, and nearly 4,000 pieces of apparatus and equipment. It not only improves the utilization rate of the equipment but also cultivate the students' innovative practical ability of the practice.

(4) Guide Freescale automobile competition and Tianhua cup electronic design competition. Many teachers instruct Freescale automotive competition and Tianhua Cup electronic design competition, which a chance to accumulate a wealth of practical experience. Through the competition, the students ' innovative passion and sense of accomplishment are improved.

(5) Guide the senior undergraduate students to enter the research office. Higher grades undergraduate student possess a comprehensive theoretical basis which benefits teachers actively guide them to enter the research office to take up the teachers' research projects, which improve the engineering practice ability of students and inspire their creative passion.

4. Conclusions

Creative and practical ability of college students involve in professional practice ability, creativity, entrepreneurship and so on. The innovative practice ability training is a complicated system project. Many universities in our country has opened Electronic information engineering major ,but on the talent training systems are different, so we must strengthen exchanges with other universities, including the discussion the universal law of electronic and information engineering talent cultivating mode to improve the creative ability of students constantly.

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